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XC-142A

VTOL TRANSPORT PROGRAM

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MONTHLY PROGRESS REPORT, no. 25,

FOR

JANUARY 1964.

LTV VUGHT AERONAUTICS DIVISION

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L. C. Josephs  
VTOL Program Director

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## INTRODUCTION

This report has been prepared in accordance with the requirements of Item 7 of Contract Number AF33(657)-7868 and is the twenty-fifth in a series of monthly reports covering activity in the XC-142A VTOL Transport Aircraft Program.

This report is devoted specifically to a summary of progress for the month of January, 1964.

### SUMMARY

At the end of January, the overall XC-142A program was approximately two weeks behind schedule with the total Engineering task 77 percent complete, Manufacturing 62 percent complete and Tooling essentially complete except for tool maintenance and modifications due to design changes. At the end of the month, installation and mockup work on the airplane #1 wing and fuselage progressed to the point wherein the wing could be mated to the fuselage.

The wing-up flight condition tests on the static article were started in January with tests of the inboard engine mounts and engine mount support structures having been completed by the end of the month. The closed loop tests of the collective system were completed on the flight control simulator and dynamic tests on the stabilization system were initiated. Fabrication of the test rig for escape system tests was completed in January and design of the test rig for the 50-hour tie-down test to be conducted on airplane #1 was approximately 75 percent complete at the end of the month. Two integral gearcases were joined with two engines and installed in nacelle positions 1 and 2 on the propulsion integrated test stand. Ground effect tests on the Princeton XC-142A track model were completed with results indicating negligible loss of lift due to ground effects.

Three budgetary proposals were submitted to ASD during the month: Elimination of Cargo Compartment Trim (ECP 21), Deletion of Category I Flight Test in Airplane #4 (ECP 20) and Redesign of the Main Propeller Blade. Three firm proposals were submitted in January: Program Reduction Items (ECPs 5, 6, 8, and 9), Full Scale Prop/IGC Tests at Ames (ECP 18) and Modification to the Contract to include Data Requirements Change.



# XC-142A

BASE LINE DATE APRIL 1963

## PROGRAM MASTER PLAN

1962

1963

1964

1965

1966

### MILESTONES

GO-AHEAD - LETTER CONTRACT  
COCKPIT MOCK-UP INSPECTION  
AIRPLANE MOCK-UP INSPECTION  
REC. SMA AFT SEC.  
DEFINITIVE CONTRACT  
BASIC DESIGN (95 %)  
REC. ENGINE (GFE)  
BASIC WIND TUNNEL TESTS  
MAJOR TOOL FAB.  
AEROSPACE GROUND EQUIP. AVAIL.  
STATIC TEST ARTICLE  
SHOP COMPLETE #1 A/C  
REC. WING  
SHOP COMPLETE #2 A/C  
REC. AFT SECTION  
REC. MID SECTION SHAFING  
REC. ENGINES (GFE.)  
SAFETY OF FLIGHT INSPECTION  
#2 A/C AIRPORT OPERATIONS  
FIRST CONVENTIONAL FLIGHT  
SHOP COMPLETE #3 A/C  
REC. TAIL PROPS IGC  
#1 A/C AIRPORT OPERATIONS  
SHOP COMPLETE #4 A/C  
AIRPORT OPERATIONS  
#4 A/C AIRPORT OPERATIONS  
FIRST HOVER FLIGHT  
REC. MAIN PROP IGC  
SHOP COMPLETE #5 A/C  
#5 A/C AIRPORT OPERATIONS  
FIRST A/C COMP. INSP. (FACI)  
A/C DELIVERIES  
GROUND TEST PROGRAM  
CATEGORY I FLIGHT TEST  
CATEGORY II SUPPORT

S= STATIC  
T= CVC ENGINE  
TEST  
P= PITS

DEC

BASIC

INT. FLT

TOTAL PROGRESS  
POSITION

ITEM 1.A DEVELOPMENT OF XC-142A AND FABRICATION OF FIVE PROTOTYPE MODELS

1.A.1 ACCOMPLISHMENTS

Airplane #1 remained in the final installation line during the month as scheduled. Prototyping of fluid lines and installation of electrical wires continued commensurate with installation of associated hardware and was 90 percent and 65 percent complete respectively. Installations within the wing pivot area on airplane #1 were essentially complete at the end of the month in preparation for attaching the wing to the fuselage. The engine to nacelle mockup and fit check effort was completed for all four nacelles. The mid and nose sections for airplane #2 were completed and mated along with the aft section during the first week of January. The wing for airplane #2 was received from Ryan on 22 January and was in preparation for undergoing tests prior to installation on the airplane. The upper and lower mid sections for airplane #3 were completed early in the month and loaded into the main mid section fixture. Detail parts for airplanes #1 and #2 and the static article were essentially complete and for airplanes #3, #4 and #5 80 percent complete at the end of the month.

1.A.2 PROBLEM AREAS

1.A.2.1 Aircraft Major Assembly

The fabrication effort of airplanes #1 and #2 remained approximately eight days behind schedule at the end of January but this condition is not expected to have impact on program objectives. The most critical scheduling item at the end of the month was the late availability of the main propeller integral gearcases (see ITEM 7).

1.A.2.2 Wing Incidence and Flap Actuating Screwjacks

Testing of the wing and flap actuating screwjacks continued at



Jerry Hydraulics during January. Acceptance of the short stroke flap screw-jack was expected at the end of the month; however, further testing of the long stroke flap screwjacks and the wing screwjacks was anticipated with availability of these screwjacks not expected before late February. Upon receipt, the production screwjacks will be installed in place of the interim equipment currently in use in the fabrication and test programs.

ITEM 1.B            FABRICATION OF STATIC TEST ARTICLE

As stated in the report for last month, the static article fuselage was essentially completed and moved to the test laboratory. The fuselage was installed in the static test fixture during January and tests commenced (see paragraph 3.1.2.2.3). Since the fabrication effort associated with the static test article has been completed for all practical purposes, except for test laboratory support required during the test phase, no further reporting is contemplated under this Item of the contract.

ITEM 2            FABRICATION OF MOCKUP (Complete)

ITEM 3            GROUND TEST PROGRAM

3.1                ACCOMPLISHMENTS

3.1.1             Wind Tunnel (Complete - see paragraph 4.2.3)

3.1.2             Structural Tests

3.1.2.1           Design Information Tests

3.1.2.1.1        Engine Mount Element Test

As the result of failures during element testing as reported in previous monthly reports, the IGC adapter fittings have been redesigned. Further evaluation to insure indefinite fatigue life of the redesigned fitting



lug configuration will be conducted on a number of specimens in February. The engine mount strut was cycled to  $10^7$  cycles of 12,000 lbs. steady load  $\pm$  1500 lbs. oscillating load without failure.

### 3.1.2.2 Static Test Program

#### 3.1.2.2.1 Instrumentation

Installation of strain gages on the static test fuselage continued on schedule.

#### 3.1.2.2.2 Airplane Drop Test

Nose gear calibrations were 50% complete and on schedule. The airplane safety catch structure and wheel spin-up designs were released to the shop for fabrication. The Drop Test Plan report was prepared for submittal to ASD in early February.

#### 3.1.2.2.3 Airplane Static Tests

The wing-up flight condition tests were started in January. Tests of the inboard engine mounts and engine mount support structures were completed on 29 January. The PITS proof load tests on the fuselage wing pivot bulkhead and wing actuator gimbal support structure were completed on January 9 and 14 respectively. ECP 10 calibration of the #2 airplane UHT was completed 9 January. ECP 10 calibration of the #1 airplane wing was completed 24 January. Design of the vertical tail and boom calibration fixtures continued on schedule. Test reports for static load tests of the wing trailing edge control surfaces and static load tests of the control linkages were prepared for submission to ASD in early February.

### 3.1.3 Flight Control System Tests

#### 3.1.3.1 Prop Pitch Actuator Transfer Valve

Pre-qualification continued on both the main and tail prop

transfer valves. As reported last month, a seizure was experienced on one set of tail prop sleeves during the room temperature thermal equilibrium evaluation tests. During investigation of this seizure, tests continued on the remaining tail prop assembly with a seizure occurring on this assembly during the elevated temperature thermal equilibrium evaluation. Further test work on the tail prop assemblies was terminated pending complete investigations of these failures. The test set-up for main prop transfer valve endurance and environmental tests was completed and checked out and the pressure impulse tests started on one assembly.

#### 3.1.3.2 Flight Control System Test Stand

Significant progress on the Flight Control Simulator was made during the reporting period. The collective system closed-loop tests were completed. Rigging of the longitudinal, lateral and directional systems was completed and the static portion of the shakedown tests was completed on these systems. The dynamic portion of the shakedown tests was started on the longitudinal system. The stab system was completely checked out statically and dynamic tests were initiated.

#### 3.1.4 Engine System

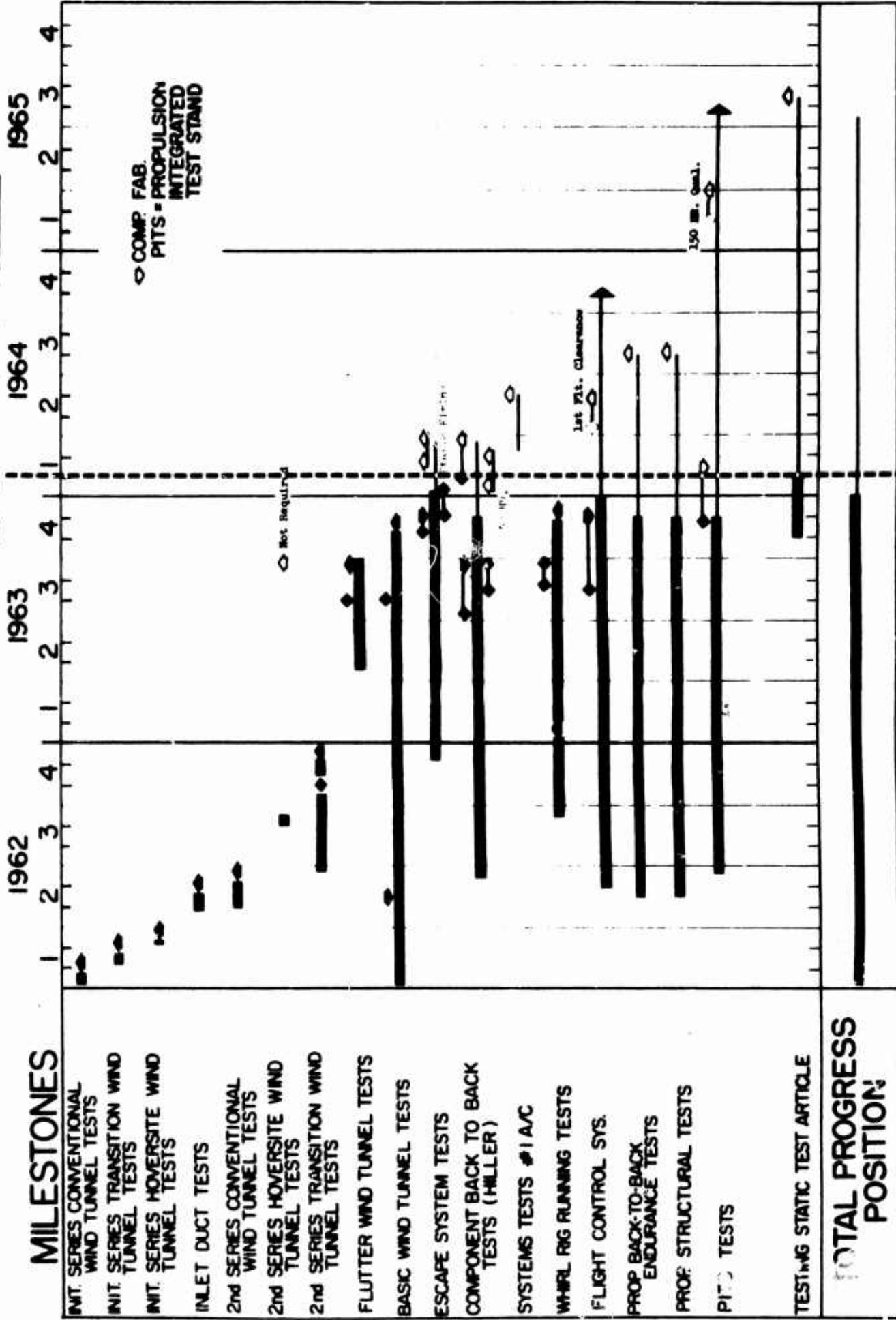
Emphasis was devoted to completion of the vibration investigation of the engine, propeller, and test stand through the complete operational envelope. A cross shaft resonance peculiar to the engine test stand gearcase was reported in the report for last month. When vibration limits were established by Hamilton Standard, it was found that the amplitude of this resonance fell well within these limits. During early runs it was noted that both the engine and integral gearcase oil temperatures exceeded test limits. Test stand heat exchangers and additional thermocouples were installed in both lubrication



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# GROUND TEST MASTER PLAN



systems to reduce temperatures and accumulate additional data. During tests in late January, a vibration excitation on the engine compressor frame was observed. Further testing and study revealed that the vibration limits were exceeded while operating between 76 percent and 87 percent gas generator RPM. An immediate inspection of the engine, gearcase, and test stand revealed no causes for the vibration. A thorough investigation was in progress by LTV and GE at the end of January. Meanwhile, engine tests continued at LTV with restrictions governing operation within the above critical RPM's.

### 3.1.5 Airframe Vibration Tests

#### 3.1.5.1 Wing Vibration Tests

The test set-up was completed as previously reported and the tests are scheduled to start late in February.

#### 3.1.5.2 UHT Vibration Tests

The tests were satisfactorily completed during the month.

#### 3.1.5.3 Airplane Vibration Tests

Design of the airplane suspension system and shaker installation was completed and fabrication started.

#### 3.1.6 Fifty-Hour Tie-Down Test

Design of the airplane tie-down rig was 75 percent complete and on schedule at the end of January.

#### 3.1.7 Escape System

Jig fabrication was completed in January. Ejection seat tests were rescheduled to begin in April to insure completion of seat support structural tests in the static article prior to seat ejection tests.

#### 3.1.8 Major Component Control System Tests

The test set-up was completed for control system tests on the wing for airplane #2. Actual tests are to begin in early February.

3.1.9           Transmission System Tests

3.1.9.1       Main Propeller Integral Gearcase

Back-to-Back Test - The right-hand main IGC component 30-hour test without extension housing and cross-shaft was completed. The teardown inspection revealed several minor distress areas which could be satisfactorily corrected. An additional 21 hour test will be conducted on the right-hand main IGC component with the modified cross-shaft housing when it becomes available. The development test on the left-hand main IGC started during the month.

Engine System Test - Development testing continued during this period. Acceptance testing of PITS IGC-propellers 1, 2 and 3 was completed. It is anticipated that #4 IGC-propeller will be acceptance tested during the first week in February.

3.1.9.2       Tail Propeller Integral Gearcase

Engine System Test - The 50-hour preproduction test was completed during this period and a teardown inspection conducted. Acceptance testing of the PITS propeller gearcase experienced failure on two occasions due to gear scoring and poor tooth patterns. These problems were under study at the end of January with resolution expected in early February.

3.1.9.3       Design Information Element Tests (DIET)

3.1.9.3.1     Bearing - An accelerated life test was performed and completed on a self-lubricated brake bearing. The bearing experienced a small amount of fretting under the inner race; however, this was considered to be insignificant and the test was considered successful.



XC-142A LTV ENGINE TEST RIG



XC-142A LTV FLIGHT CONTROL SIMULATOR



The reworked wing shaft bearings were received and will be fatigue-tested immediately after the refurbishing of the shaft DIET stand gearcases (new gears and lube system). It is anticipated that this work will be completed by 21 February 1964.

3.1.9.4 Back-to-Back Stands

3.1.9.4.1 Pivot Gearcase

The development and slave pivot gearcase gear shafts were reworked after considerable plating problems to provide the bearing fits recommended by the bearing vendor and were installed in the gearcases. A gear tooth pattern check was made. Several lubrication runs were made with reworked baffles and the new bearing press fits to verify the delta temperature data previously taken with break-in oil. Although previous tests indicated that the clutch could probably be scavenged by running a line from the clutch to the pivot gearcase scavenge area, the tests conducted during this period with MIL-L-7808D oil showed that the clutch had to be scavenged separately in order to bring the delta temperature through the gearcase clutch down to an acceptable value. The required new pump will be mounted on the tachometer pad with the tachometer mounted on the end of the pump. A one-element scavenge pump procurement spec is being written and will be released in early February.

Gearcase efficiency and transient characteristics were being determined in a 10-hour development test prior to starting the 50-hour bench test which is scheduled to start 17 February.

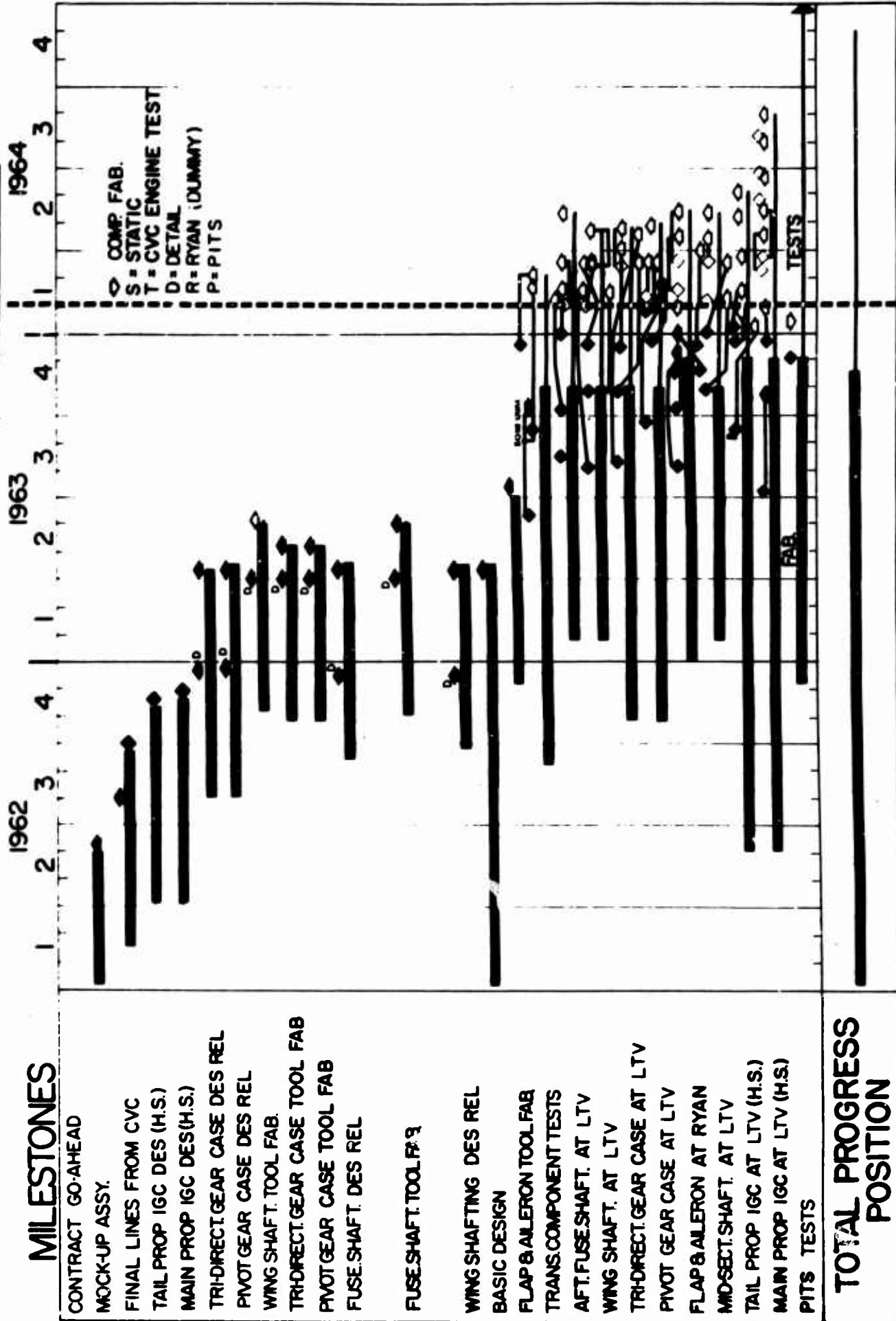
3.1.9.4.2 Tri-Directional Gearcase

Difficulties experienced in obtaining a satisfactory bearing land build-up with nickel plate delayed the completion of the development testing on this gearcase. However, scavenge studies were conducted on the development



**XC-142A**  
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**HILLER  
MASTER  
PLAN**



gearcase at no load using another set of gears. Modified baffle designs, manifolding of all four gear housings and various scavenge pump arrangements were studied. Satisfactory delta temperatures through the gearcase in the horizontal and vertical modes were obtained with the modified baffles and scavenging all four housings. This meant that two additional scavenge elements were required in the tri-directional scavenge pump. The procurement of the redesigned pump was in process at the end of the month. The reworked gears were being installed in the development and slave gearcases and the 10-hour development test, including efficiency check, transient and scoring tests, will be conducted prior to the 50-hour bench test which is scheduled to start 17 February 1964.

#### 3.1.9.5 Propulsion Integrated Test Stand (PITS)

Two main IGC's were delivered and blades installed during this period. The IGC's were joined to engines and installed in nacelle positions 1 and 2. Assembling of the controls and hydraulic system components and plumbing continued during this period. Two additional engines were built up and delivered to the PITS site by LTV. The PITS test plan was reviewed with ASD on 23 January 1964 and agreement reached on a duty cycle and scheduled teardown inspections.

#### ITEM 4 ENGINEERING DATA

##### 4.1 ACCOMPLISHMENTS

##### 4.1.1 General

The XC-142A engineering effort continued to be devoted to support of the manufacturing and test programs plus preparation of required program documentation. At the close of the report period acceptance test specifications were essentially complete, 111 out of 128 operational test

specifications were complete, AGE design progressed on schedule, and mockup and installation design were essentially on schedule. Weight of the aircraft as of 31 January was 851 pounds over guarantee with weight control continuing to be exercised on a minimum control basis as directed by ASD for economy reasons.

Follow-up engineering effort was maintained at Hiller on the transmission back-to-back test stands and PITS. Procurement specs were written for a four element scavenge pump for the tri-directional gearcase and for a single element scavenge pump for the clutch on the pivot gearcase. The transmission system dynamics report and basic loads report were in work and all structural plans of task had been written except for one.

All basic engineering effort at Ryan had been completed and drawings sent to LTV including changes resulting from the engine to nacelle mockup on the wing for airplane #1. All aft section and empennage fluid and electrical mockup information was incorporated into the drawings by the end of January. Incorporation of similar data into the wing drawings was in process with completion anticipated by mid-February. The major task remaining is completion of final stress reports anticipated in early May.

Value Engineering studies on the XC-142A program continued but on a reduced scale as compared to the efforts expended during the basic design program. Four Value Engineering studies in the area of aerospace equipment, specifically pitot tube covers, ladders, hoist slings and hoist sling adapters were completed providing a savings for the five airplane contract. Documentation relative to these and additional cost savings items will be forwarded to ASD.

#### 4.1.2 Airframe

Basic design of all structure is complete.

#### 4.1.3 Propulsion

Efforts during the reporting period continued to be centered around support of the engine test stand and PTF programs. (See paragraphs 3.1.4 and 3.1.9.5)

#### 4.1.4 System and Components

Basic design of all systems and system components is complete. Engineering effort in these areas continued to be devoted to support of the manufacturing and test programs. Qualification tests of the Auxiliary Power Unit (APU) were completed and the unit shipped to LTV. Work continued on mockup of airplane #1.

#### 4.2 PROBLEM AREAS

##### 4.2.1 Wing Incidence and Flap Screwjack Actuators

As stated in previous progress reports, the wing and flap screwjack actuators were rejected due to a high torque problem and were returned to the vendor for correction. All actuators now incorporate friction plates of silver rubbing against carburized steel. Six short stroke flap actuators completed acceptance testing and one wing incidence actuator was being tested at the end of January with good results. Additional wing incidence actuators were being assembled for testing. The redesigned long stroke flap actuator with a new ball thrust bearing will be tested in early February.

##### 4.2.2 Propeller Pitch Follow-up Rod

As stated in the December Progress Report, the redesigned tail propeller pitch actuator follow-up rod was installed on the Hilltop test rig at Hamilton Standard. Tests of the new design were conducted in early January.

High speed motion pictures indicated a very definite reduction in vibration and deflection. Redesign of the main follow-up rod and linkage and the tail propeller control package support casting was completed.

#### 4.2.3 Aerodynamic and Tunnel Investigation

Ground effect tests on the Princeton XC-142A track model were successfully completed on 21 January. It was reported by Princeton that the loss of lift in ground effects was negligible. Pictures and force data are to be forwarded to LTV by Princeton.

#### 4.2.4 Longitudinal Stability

As stated in the report for last month, the neutral point or furthest aft center-of-gravity (c.g.) at which the airplane is longitudinally stable is 33.2 percent for a rigid airplane. This neutral point shifts forward due to aeroelastic effects at high equivalent airspeeds so that the maximum aft airplane design c.g. location is not attainable. Changes which would improve the longitudinal stability margin were under study at the end of January. ASD was briefed on the problem on 23 January and a second ASD briefing is planned in late February. ASD concurred with the Contractor's recommendation to replace the existing wing incidence actuator aluminum gimbals with steel gimbals.

### ITEM 5 DESIGN DATA

#### 5.1 Design Data

Preparation of design data reports as required by the Contract Data Requirement Document continued. During January, the Contractor submitted the hydraulic, powerplant, performance and flying qualities flight test plans, the revised structural description report, the weight and balance status report, aerodynamic wind tunnel data reports, and the revised design data check-off list.

A total of eight design data reports were late to schedule at the close of the reporting period. These consisted essentially of flight and ground test plans and ground test reports. All are anticipated to be available during February.

#### 5.2 Surveillance Items

Work continued on documentation concerning surveillance items, particularly the preparation and submittal of test plans. Several test plans and test reports were submitted during January. Considerable effort was being devoted to completing the PITS test plan. A review of the preliminary draft of the PITS plan was conducted at ASD on 24 January. Submission of the finalized test plan is anticipated by 21 February.

#### 5.3 Status of Technical Data

Overall status of design data and surveillance data as of 31 January was as follows:

	<u>Design Data</u>	<u>Surveillance</u>	<u>Total</u>
Total Submission to Date	111	134	245
Total Submission to Go	110	94	204
Grand Total	221	228	449
Percent Complete	50%	58%	54%

#### 5.4 SCN Status

As of the end of December, a total of 88 specification change notices against contract reports had been submitted to ASD for approval. Sixty-five of these had been approved. Fourteen were disapproved and nine pending at the end of January.

#### 5.5 Certification

The Contractor initiated preparation of a complete listing of surveillance and non-surveillance components and systems for the purpose of



certification check-off. The list is anticipated to be available in March and will be maintained and coordinated with the Bureau of Weapons Representative at LTV until all items have been certified. The list will include 96 surveillance items for which certification of qualification is to be submitted to ASD. To date, qualification reports covering five of the total number of surveillance items have been submitted.

ITEM 6                    FLIGHT TEST AND DEMONSTRATION

6.1                      ACCOMPLISHMENTS

6.1.1                    Instrumentation

The instrumentation effort during the reporting month was devoted to fabrication, acceptance testing, calibration, and installation of equipment. Equipment availability for airplanes #1, 2 and 3 at the end of the month was 100%, 85% and 67% respectively. Calibration of the #1 wing and #2 UHT was completed, installation of strain gages in the static article and airplane #1 for ECP 10 was completed; strain gage installation on airplane #1 was completed and 90% complete on #2 airplane.

6.1.2                    Flight Test

General planning and coordination of the flight test program continued during the month. Flight Test Plans covering flying qualities, propulsion, performance and hydraulics were completed and submitted to ASD for approval. Flight test plans covering the 50-hour airplane tie-down tests and structural tests were in preparation.

ITEM 7                    REPORTS

The progress report for the month of December was submitted to ASD on 20 January 1964, and the semi-annual report for the period July-December

1963 was submitted on 28 January. The PERT report for the month of December was submitted on 8 January. At the end of January, a negative slack condition existed in the path through the main propeller integral gearcase as a result of a revised cross-shaft housing casting. Consequently, a day-to-day follow-up on progress on this item at Hamilton Standard was being maintained. In the meantime, tasks at LTV dependent upon availability of the IGCs were being analyzed with a view toward concurrent performance. The cost progress report for the month of December was submitted on 24 January.

ITEM 8 SPARE PARTS FOR FIVE PROTOTYPE AIRPLANES

As noted in the report for last month, a spares list print-out was released showing 536 items on order. A review of the overall program requirements was made with the result that availability of initial units is now scheduled for April 1964.

ITEM 9 DEVELOPMENT AND FABRICATION OF AGE

Analysis continued during January of outstanding items in process of Air Force approval and inventory review in order to provide equivalent, substitute or alternate Government furnished aerospace ground equipment that is compatible to the XC-142A system requirements. The status of AGE at the end of January was as follows:

<u>Through January</u>	<u>Anticipated</u>	<u>Submitted</u>	<u>Approved</u>	<u>Demons.</u>
CFE AGERD	102	94	57	3
GFE AGERD	41	41	35	1

ITEM 10 SPARE PARTS FOR AGE

No activity during January.

ITEM 11            TRAINING AND TRAINING EQUIPMENT

A review of the training plan and courses to be offered to Government personnel was held at AFFTC EAFB on 13-14 January. Contractor personnel training courses were scheduled to resume in early February.

ITEM 12            CONTRACTOR SUPPORT OF FLIGHT TEST PROGRAM

The Product Support Plan was in process of up-dating at the end of January to agree with the minutes of the Training and Support Guidance Conference held at LTV in September, 1963. It is anticipated that the revised report will be submitted to ASD in February.

TRIPS DURING JANUARY, 1964

<u>Date</u>	<u>Place</u>	<u>Subject</u>
2	Hiller	Technical coordination of PITS
6-8	Hamilton Standard	Review program status
6-10	Jarry Hydraulics Taylor Devices Linde Company	Expedite subcontracted components
8	Hiller	Coordination of engine check-out and run procedures on PITS rig
12-31	Jarry Hydraulics	Technical and expediting assistance on wing and flap actuators
13-14	AFFTC, EAFB	Review training plan and training course structure
13-15	ASD-SPO	Discuss repair and overhaul of CFE and major engine inspections
19-22	ASD-SPO	Review program cost study
19-22	Hiller	Review GFAE accountability
20	Hiller	Technical assistance on test programs
23	ASD-SPO	Discussion of longitudinal stability
24	ASD-SPO	Review of preliminary PITS test plan
27-29	Ryan	Review program status
28-29	ASD-SPO	Discuss spares program
28-30	Hiller	Review program status

VISITS TO CONTRACTOR'S FACILITY DURING JANUARY, 1964

<u>Date</u>	<u>From</u>	<u>Subject</u>
4	Army General Depot, Dallas, Fort Worth	Program familiarization
6	Keesler AFB, Post- Graduate School	Program familiarization
7	T-64 Engine Project Office, BuWeps	Review program status
8	AFFTC, EAFB	Determine training level requirements
13-14	Congressional Committee Staff Members	Program review
14	Army TRECOM	Review technical status
21-23	ASD-SPO	Review technical status
31	Asst. Secretary of the Army (R&D)	Program familiarization

### FUTURE SIGNIFICANT EVENTS

It is anticipated that the following significant items will be accomplished during the next three months:

#### February

- Completion of T-64 engine test stand Phase I tests
- Submission of PITS test plan
- Start of 50-hour qualification tests of pivot and tri-directional gearcases
- Completion of IGC back-to-back tests with unmodified and modified cross shaft
- Start of PITS non-rotating shakedown tests
- Receipt of fuselage shafting for airplane #1

#### March

- Completion of 50-hour qualification tests of pivot and tri-directional gearcases
- Start of Phase II engine test stand tests
- Conduction of fire extinguishing system qualification tests
- Start of airplane drop test program
- Completion of Flight Control Simulator Shakedown tests and start of closed-loop tests
- Completion of electrical generating system mockup tests
- Receipt of wing shafting for airplanes #1 and #2

#### April

- Clearing of PITS for 150-hour TBO qualification
- Completion of drop test program
- Start of escape system ejection tests
- Start of fuel cell qualification tests
- Receipt of pivot and tri-directional gearcases for airplanes #1-3

In addition, it is anticipated that the following proposals will be submitted to ASD in February:

#### Budgetary

ECP 23, Extension of Category I Flight Test Program

#### Firm

ECPs 4 and 10, Evaluation of In-flight Load Evaluation Program and Addition of Structural Demonstration Instrumentation

ECP INDEX

<u>ECP No.</u>	<u>Title</u>	<u>Status</u>
1	Fuselage, Installation of Aft Fuselage Escape Doors	Disapproved
2	Electrical, Installation of 35 KVA Generators	Disapproved
3	Electronics, Additional AT-256A/ARC UHF Communications Antenna; Installation of	Disapproved
4	Flight Tests, Category I Inflight Load Survey; Elimination of	Authorized
5	Ground Tests, Escape System Sled Tests; Elimination of	Authorized
6	Fuel System, Ferry Fuel Tank; Elimination of	Authorized
7	Escape System, Douglas Escapac 1-C Ejection Seat in Lieu of LW-1 (Modified)Seat; Installation of	Cancelled
8	Furnishings; Cargo, Troop Accessories for Four Airplanes, Elimination of	Authorized
9	Ground Test, Wing Fatigue Test; Elimination of	Authorized
10	Structural Demonstrator Instrumentation, Addition of	Authorized
11	Ground Test, Structural Failing Load Test, Elimination of	Authorized
12	Navigation Equipment, AN/ARC-21C in Lieu of AN/ARN-52 (V); Provisions for	Disapproved
13	Propulsion System, Integral Gearbox Propeller System Test; Reduction of	*
14	Drawing Quality Requirements; Reduction of	*
15	Weight Control Policy; Revision of	Disapproved
16	Main Propeller IGC Bearing Change	Authorized
17	Aluminum Forging Treatment to Improve Corrosion Resistance	Cancelled



<u>ECP No.</u>	<u>Title</u>	<u>Status</u>
18	Redesign Main Propeller Blade; Full Scale Test at NASA-Ames	Authorized
18-1	Redesign Main Propeller Blade; 0.60 Scale Test at NASA-Ames	Authorized
19	Elimination of Engine Nacelle Anti-Icing	Cancelled
20	Electrical System, Load Evaluation Flight Tests; Elimination of	Pending
21	Cargo Compartment Trim; Elimination of	Pending
22	Revision to Engine Throttle Control Mechanism	Pending
23	Extension of Category I Flight Test Program	Pending

\* No longer identified as ECP; to be submitted as separate proposal.

CCN INDEX

<u>CCN No.</u>	<u>Title</u>	<u>Date</u>
1	Substitute 35 KVA Generator for 25 KVA Generator	12-19-62
2	Reduction in Data Requirements and Engine Designation Change	4-26-63
3	Substitute 25 KVA Generator for 35 KVA Generator	2-04-63
4	Reduction in IGB Propeller Testing	5-03-63
5	Approval of ECPs 4 - 9	6-05-63
6	Elimination of Structural Failing Load Tests	7-23-63
7	Approval of ECPs 5, 6, 8, 9, 16	7-23-63
8	Additional Electronic Support Equipment	7-19-63
9	Cancellation of CCNs 5 and 7 and Approval of ECPs 5, 6, 8, 9, 16	8-02-63
10	Partial Cancellation of CCN No. 2 and Reinstatement of Reduction in Data Requirements	8-22-63
11	Partial Cancellation of CCN No. 2 and Reinstatement of Engine Designation Change	8-22-63
12	Approval of ECP 18-1	9-30-63
13	Approval of ECPs 4 and 10	11-13-63
14	Approval of ECP 18	11-19-63
15	Approval of Revision to Contract Data Requirements Document	12-5-63

LIST OF ABBREVIATIONS

A/C	Aircraft
AGE	Aerospace Ground Equipment
AMC	Army Materiel Command
APU	Auxiliary Power Unit
ASD	Aeronautical Systems Division
ATC	Air Training Command
CFE	Customer Furnished Equipment
DIET	Design Information Element Test
EAFB	Edwards Air Force Base
ECP	Engineering Change Proposal
GFE	Government Furnished Equipment
IGC	Integral Gear Case
PERT	Program Evaluation and Review Technique
PITS	Propulsion Integrated Test Stand
QEC	Quick Engine Change
SPO	Systems Program Office
UHT	Unit Horizontal Tail
CCN	Contract Change Notice